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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/655,221   | 09/05/2003  | Yun Bok Lee          | 0465-1023P          | 6996             |
| 2292   | 7590        | 07/26/2005           | EXAMINER            |                  |
| BIRCH STEWART KOLASCH & BIRCH<br>PO BOX 747<br>FALLS CHURCH, VA 22040-0747 |             |                      | QI, ZHI QIANG       |                  |
|  |             |                      | ART UNIT            | PAPER NUMBER     |
|  |             |                      | 2871                |                  |

DATE MAILED: 07/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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|                              |                                      |                                   |  |
|------------------------------|--------------------------------------|-----------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/655,221 | <b>Applicant(s)</b><br>LEE ET AL. |  |
|                              | <b>Examiner</b><br>Mike Qi           | <b>Art Unit</b><br>2871           |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 May 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-5, 7-17, 19, 20 and 23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 21 and 22 is/are allowed.
- 6) ☒ Claim(s) 6, 18 and 24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)                                    | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Drawings***

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the thin film transistor between the insulating layer and the first alignment layer and forming a thin film transistor array on the insulating layer of the first substrate before forming the first alignment layer as claimed in claim 2 and 11 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-2, 5, 7-11, 13-14, 16, 19-20 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,650,390 (Sakamoto et al) in view of US 6,822,723 (Song et al).

Claims 1, 10 and 23, Sakamoto discloses (col.6, line 24 – col.7, line 19; Fig.4) that a multi-domain liquid crystal display device comprising:

- first and second substrates (411, 431) being opposite to each other;
- color filter layer (418) having an opening on the first substrate (411) (the opening is a gap between two color filters different from each other);
- first flattening film (420) formed of acrylic resin (see col.8, lines 46-53; Fig.7) that is an insulating material, so that the first flattening film (420) functions as an insulating layer on the first substrate (411) including the color filter (418);
- the control electrode (421) is a conductive film (col.8, lines 58-60) and connected to the source electrode (415) through a contact hole (422), so that the control electrode (415) also functions as pixel electrode and including on the first substrate (411) including the insulating layer (420);

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- first alignment film (see col.7, lines 5-7) is deposited on the second flattening film (423), and that also is on the first flattening film (420) (i.e., an alignment film formed on the insulating layer);
- second alignment film (see col.7, lines 8-15) is deposited on the opposite electrode (common electrode 432), and that also is formed on an entire surface of the second substrate (431);
- liquid crystal layer (45) between the first and second substrate (411, 431).

Sakamoto does not explicitly disclose that a protrusion on the second substrate and corresponding to the opening of the color filter.

Song discloses (col.3, line 11-53; Fig.2) that a protrusion (31) is formed on a substrate (11), and each color filter (71) has a groove (711) (opening) (711), and the protrusion (31) is corresponding to the opening pattern (711), and alignment layers formed on the common electrode (81) and the pixel electrodes (21) respectively, so that the alignment film is also formed on the substrate including the protrusion (31). Song also discloses (col.2, lines 26-28) that forming color filters either at the first substrate or at the second substrate, such that each color filter has a groove (such as opening 711) corresponding to the protrusion. The protrusion (such as 31) formed on common electrode would be an obvious variation. Song indicates (col.3, lines 48-50; Fig.2) that the protrusion (31) formed on the opening pattern (211) corresponding to the groove (opening) between the color filters (71) makes it easy to align the liquid crystal molecules (911) as partitioned. Song also indicates (col1, lines 48-50) that such liquid crystal display achieves a wide viewing angle in simplified processing steps.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to modify the liquid crystal display of Sakamoto with the protrusion on a substrate corresponding to the opening of the color filter (either at first substrate or at second substrate) as taught by Song in order to achieve a wide viewing angle in simplified processing steps, since the protrusion corresponding to the opening between color filters makes easy to align the liquid crystal molecules as partitioned.

Claims 2, 8, 11 and 19, Sakamoto discloses (Fig.4) that the thin film transistor is formed between the first substrate (411) and the color filter (418), and the first flattening film (420) functions as the insulating layer, and the second flattening film (423) functions as the passivation layer, so that the passivation layer including the thin film transistor formed on the insulating layer. Sakamoto also discloses (col.7, lines 8-15) that alignment film is disposed on the second flattening film (insulating film) (423), and that is the TFT between insulating film and alignment layer.

Claims 5 and 13, Sakamoto discloses (col.7, lines 8-15; Fig.4) that the opposed electrode (common electrode 432) is formed on the entire surface of the second substrate (431), and then a second alignment film is deposited on the opposite electrode (common electrode 432).

Claims 7 and 16, Sakamoto discloses (col.8, lines 46-53; Fig.7C) that using acrylic resin to form the first flattening film (420) (insulating layer), i.e., using acrylic resin to form the insulating layer.

Claims 9 and 20, Sakamoto teaches the invention set forth above. Sakamoto lacks that a black matrix layer between the second substrate and the common electrode.

However, Song discloses (col.4, lines 16-23; Fig.4B) that a black matrix (61) is formed on a second substrate (51), and a common electrode (81) is formed on the black matrix (61), so that the black matrix (61) is between the second substrate (51) and the common electrode (81); and the material of the black matrix (61) is a metallic or opaque material. The metallic or opaque material shields the lights, so that such black matrix would prevent the light leakage and increasing the display contrast (such as the applicant admitted prior art indicated in background of the invention of the specification, paragraph 0021 and Fig.2, a black matrix layer 26 preventing light from leaking).

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to modify the liquid crystal display of Sakamoto with the black matrix layer between substrate and common electrode as taught by Song in order to improve the display contrast, since such black matrix prevents the light leakage.

Claim 14, Sakamoto discloses (col.9, lines 21-34) that a liquid crystal are poured into the space between the two substrates that is using injection method to fill the liquid crystal through a pouring hole (inject hole).

4. Claims 3-4,12 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakamoto and as Song applied to claims 1-2,5,7-11,13-14,16,19-20 and 23 above, and further in view of US 6,583,837 (Fukumoto et al).

Claims 3-4,12 and 17, Sakamoto and Song teach the invention set forth above.

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Sakamoto lacks that the protrusion has a dielectric structure, and the protrusion is formed of acrylic resin, BCB or black resin; and the insulating layer is formed of acrylic resin, BCB, silicon nitride, silicon oxide or polyimide compound.

Song further discloses (col.3, lines 1-15; Fig.2) that the protrusion (31) is formed of silicon nitride or organic material (insulating material). Furthermore, Fukumoto discloses (col.5, lines 14-16; Fig.1) that using acrylic resin as the material of the protrusions (25,26,27). Because the dielectric structure is an insulating structure, and acrylic resin having insulating property, so that using acrylic as the material of the protrusion and the insulating layer for achieving the insulating effect.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to modify the liquid crystal display of Sakamoto and Song with using acrylic resin as the material of the protrusion and the insulating layer as taught by Fukumoto in order to obtain the insulating effect, since the material of acrylic resin having insulating property.

5. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sakamoto and as Song applied to claims 1-2,5,7-11,13-14,16,19-20 and 23 above, and further in view of US 5,263,888 (Ishihara et al).

Claim 15, Sakamoto and Song teach the invention set forth above. Sakamoto and Song lacks that using liquid crystal dropping method such as forming seal; dropping liquid crystal, forming spacer, bonding and hardening the seal pattern.

Ishihara discloses (col.4, lines 7-40; col.2, line 58 – col.3, line 51; Fig.3) that using dropping method to assembly a liquid crystal display panel wherein forming a



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sealing member on a substrate, dropping a liquid crystal material at a surface of a substrate, forming spacer for maintaining a uniform gap between the two substrates (see col.1, lines 30-32), superposing one substrate upon another substrate (bonding the two substrates), and hardening the sealing member by irradiation with ultra-violet light. Ishihara indicates (col.1, line 49 – col.2, line 2) that using dropping method to fill the space between the two substrates with liquid crystal requires a short time, i.e., performing the assembly of the liquid crystal display panel is in a short time.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to modify the liquid crystal display manufacturing method of Sakamoto and Song with the dropping method as taught by Ishihara in order to perform the assembly in a short time, since using dropping method to fill the space between the two substrates with liquid crystal requires a short time, i.e., fast to fill the liquid crystal.

#### ***Allowable Subject Matter***

6. Claims 21 and 22 are allowed.
7. Claims 6, 18 and 24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
8. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record neither discloses nor teaches that a multi-domain liquid

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crystal display and a manufacturing method of a multi-domain liquid crystal display comprising various elements and steps, more specifically, as the following:

the opening (in the color filter) on the first substrate has a pinwheel-shape as shown in Fig.5 [claims 6, 18, 21-22 and 24].

The closest references such as US 6,650,390 (Sakamoto et al) and US 6,822,723 (Song et al) disclose that the color filter having opening and the opening corresponding to the protrusion so that easy to align the liquid crystal molecules as partitioned. However, non of the prior art of record disclose such opening in the color filter having a pinwheel-shape as claimed.

### ***Response to Arguments***

6. Applicant's arguments filed on May 10, 2005 have been fully considered but they are not persuasive.

1) Song discloses (col.3, line 11-53; Fig.2) that a protrusion (31) is formed on a substrate (11), and each color filter (71) has a groove (711) (opening) (711), and the protrusion (31) is corresponding to the opening pattern (711). Song also discloses (col.2, lines 26-28) that forming color filters either at the first substrate or at the second substrate, such that each color filter has a groove (such as opening 711) corresponding to the protrusion. The protrusion (such as 31) formed on common electrode would be an obvious variation. Song indicates (col.3, lines 48-50; Fig.2) that the protrusion (31) formed on the opening pattern (211) corresponding to the groove (opening) between the color filters (71) makes it easy to align the liquid crystal molecules (911) as partitioned

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that would a reason or motivation to utilize the opening of the color filter corresponding to the protrusion on a substrate, since the protrusion corresponding to the opening between color filters makes easy to align the liquid crystal molecules as partitioned.

2) The specification paragraphs [0048] and [0049] discloses that a TFT and a passivation layer are formed on the insulating layer (34), and then the pixel electrode (35) is formed on the passivation layer. Such that the reference Sakamoto also discloses (Fig.4) that TFT and a passivation layer (such as insulating layer 420 functions as a passivation layer) are formed on the insulating layer (such as passivation layer 417 also is a insulating layer), and then control electrode (421 functions as pixel electrode) is formed on the passivation layer (420).

### ***Conclusion***

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mike Qi whose telephone number is (571) 272-2299.

The examiner can normally be reached on M-T 8:00 am-5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (571) 272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mike Qi  
July 11, 2005

  
**ROBERT H. KIM**  
**SUPERVISORY PATENT EXAMINER**  
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